REMARKS

With the present amendment, claims 9 and 10 have been cancelled and claims 1, 2, 7, 8, 11, and 19 have been amended.

Claims 19-21 and 23 were rejected under 35 U.S.C. § 112, second paragraph, because claim 19 included the phrase "the disc drive" at lines 5 and 6. With the present Amendment, the phrase "the disc drive" has been changed to "the data storage device." As such, claims 19-21 and 23 are now definite.

The Office Action also indicated that Applicants were required to clarify the record with regards to the invocation of 35 U.S.C. § 112, sixth paragraph by claim 19. Claim 19 includes a limitation of "excitation reduction means defining a surface on a slider support structure in the data storage device for reducing the excitation of the surface by causing eddies in the airflow to be moved away from the surface." As required by 35 U.S.C. § 112, sixth paragraph, this limitation does not directly claim a structure for performing the claimed function. In particular, it does not describe a structure that causes eddies in an airflow to be moved away from a surface. Second, the function is clearly identified in the limitation as "reducing the excitation of the surface by causing eddies in the airflow to be moved away from the surface." Third, the structures for performing this function are found in FIGS. 2-6.

The Office Action also asserted that Applicants should clarify the record by amending the written description such that it expressly recites what structure, material or acts perform the function recited in the claim terms and phrases. Applicants draw the Examiner's attention to page 4, line 21 to page 5, line 4 where Applicants have already clearly indicated that the plurality of grooves of FIG. 2 cause vortices in a turbulent flow to be kept some distance above the surface. Further, since FIGS. 4, 5 and 6 are described as being alternative embodiments of the grooves of FIG. 2, it is clear that these structures also perform

the function of claim 19. Since the application as filed clearly indicates which structures perform the function of the means limitation of claim 19, the application does not need further amending.

Claims 1-3 and 8

Claims 1-3 and 8 were rejected under 35 U.S.C. § 102(e) as being anticipated by Katase et al. (U.S. Patent 6,125,004, hereinafter Katase) and under 35 U.S.C. § 103(a) as being unpatentable over Yamaguchi et al. (JP 63-201967, hereinafter Yamaguchi).

Katase discloses a slider for a disc drive. The slider includes a medium opposing surface that has processing traces formed on it. These processing traces are placed on the slider to cause the surface of the slider to become convex by relieving strain in the surface of the slider. Katase does not discuss how these processing traces may interact with the airflow and makes no suggestion for providing such traces on a surface to reduce the interaction between the surface and a turbulent airflow.

Although Yamaguchi has not been translated, according to its abstract, Yamaguchi provides a suspension that includes two protrusions 14 and 15 that under one embodiment are formed by groove shaped depressions formed in a bottom surface of the suspension. Yamaguchi states that these protrusions cause a reduction in the amount of turbulence in a backwash. By reducing this turbulence, the exciting force from the backwash is reduced thereby reducing fluctuations in the positioning of a slider connected to the suspension. Although Yamaguchi reduces turbulence, it does not provide a structure that would cause vortices in a turbulent airflow to be kept some distance from the surface. In the abstract of Yamaguchi, there is no mention of the vortices of the turbulence in the backwash being kept from the surface. Instead, the abstract of Yamaguchi only states that the amount of turbulence is reduced.

Claim 1 of the present application is directed to a data storage device for storing and accessing data. The storage device comprises a motor and at least one movable medium that is moved by the motor. A slider support formed of a track accessing arm and a suspension comprises at least one surface having at least two grooves. Each groove has a groove axis orientated substantially perpendicular to a mean airflow direction and each groove is separated from the other groove in a direction substantially parallel to the mean airflow direction. The orientation of the grooves is such that vortices in a turbulent airflow generated by the medium are kept distant from the surface.

Katase and Yamaguchi do not show or suggest the invention of claim 1 because they do not show or suggest placing grooves on the surface of a slider support in order to cause vortices in a turbulent airflow distant from the surface.

Although Katase does show grooves that are similar to the grooves of claim 1, it does not show or suggest placing such grooves on a slider support such as a track accessing arm or a suspension. In fact, Katase teaches away from placing such grooves on the track accessing arm or suspension, because it teaches that such grooves cause small structures to bend or camber. Since the track accessing arm and the suspension are manufactured with great precision in order to apply a desired amount of downward force on the slider, those skilled in the art would not be motivated to place the grooves of Katase on a track accessing arm or a suspension, since it would appear to change the force applied by these support components.

Further, Katase makes no mention of any aerodynamic effects associated with these grooves. In particular, Katase does not suggest that such grooves would cause vortices in a turbulent airflow to be kept some distance from a surface. As such, Katase does not provide any motivation for placing such

grooves on other surfaces such as a track accessing arm surface or a suspension surface.

Yamaguchi also fails to show grooves on a slider support that cause vortices in a turbulent airflow to be kept distant from the surface. The abstract of Yamaguchi indicates that groove shaped depressions 14 and 15 reduce the turbulence of a backwash. Yamaguchi does not state that the vortices within the turbulence are kept at some distance from the surface, but instead seems to only state that the size of the turbulence is reduced, thereby reducing the exciting force from the backwash. As such, Yamaguchi does not show or suggest placing grooves on a surface in order to cause vortices in a turbulent airflow to be kept distant from the surface.

In addition, it does not appear that the grooves in Yamaguchi are performing any aerodynamic function. Instead, it is the protrusions formed on the opposite side from the grooves that appear to be important in Yamaguchi. This can be seen in FIGS. 5 and 6 of Yamaguchi, which appear to show other embodiments of the Yamaguchi suspension. In these figures, the grooves are not present. Instead simple obstructions appear to be welded to the suspension. Thus, unlike the present invention in which the grooves cause vortices to be kept distant from the surface, Yamaguchi appears to use obstructions on the surface to reduce the turbulence in the backwash. The grooves in FIG. 2 of Yamaguchi are simply one way to form the protrusions, which perform the actual turbulence reduction.

In addition, there is no suggestion in the abstract of Yamaguchi for modifying Yamaguchi to provide grooves that would cause vortices in a turbulent airflow to be kept distant from a surface. As such, those skilled in the art would not be motivated to modify Yamaguchi in order to produce this effect.

Since neither Katase nor Yamaguchi show or suggest placing grooves on a slider support to cause vortices in a

turbulent airflow to be kept distant from a surface on the slider support, these two references do not show or suggest the invention of claim 1, or claims 2-3 and 8 which depend therefrom.

Claims 11, 12, 15 and 16

Claims 11, 12, 15 and 16 were rejected under 35 U.S.C. § 102(e) as being anticipated by Katase and under 35 U.S.C. § 102(b) as being anticipated by Yamaguchi.

Claim 11 provides a surface for a component of a structure that supports a slider in a data storage device. The surface includes a first groove having a groove axis that is substantially perpendicular to a direction of expected mean airflow and a second groove proximate the first groove and having a groove axis that is substantially perpendicular to the expected mean airflow and that is separated from the first groove axis in a direction that is substantially parallel to the expected mean airflow. The first and second grooves cooperate to keep vortices in the airflow some distance from the surface.

Neither Katase nor Yamaguchi show or suggest the invention of claim 11. In particular, as noted above, neither Katase nor Yamaguchi show grooves on the surface of a structure that supports a slider, where the grooves keep vortices in the airflow some distance from the surface. Further, neither of these references suggests that such grooves should be placed on the surface of a structure that supports a slider. As such, claims 11, 12, 15 and 16 are patentable over both Katase and Yamaguchi.

Claims 19-21 and 23

Claims 19-21 and 23 were rejected under 35 U.S.C. § 102(e) as being anticipated by Katase and under 35 U.S.C. § 103(a) as being unpatentable over Yamaguchi.

In claim 19, a data storage device is provided for storing and accessing data. The data storage device includes a moving medium that generates an airflow having eddies in the data

storage device. The data storage device further includes an excitation reduction means defining a surface on a slider support structure in the data storage device. The excitation reduction means performs a function of reducing the excitation of the surface by causing eddies in the airflow to be moved away from the surface.

The invention of claim 19 is not anticipated by Katase nor obvious from Yamaguchi because neither reference shows excitation reduction means defining a surface on a slider support structure that cause eddies in the airflow to be moved away from the surface.

As noted above, neither Katase nor Yamaguchi show that eddies in an airflow should be moved away from a surface. Further, the grooves shown in Katase would not be placed on a slider support structure as in claim 19, because Katase teaches that such grooves cause the structures they are placed on to bend and such bending of the slider support structure would be undesirable. In addition, there is no suggestion in Yamaguchi for modifying Yamaguchi to include excitation reduction means that are able to move eddies in an airflow away from a surface. As such, those skilled in the art would not be motivated to modify either Katase or Yamaguchi to form the invention of claim 19 in which excitation reduction means are applied to a slider support structure such that eddies in the airflow are moved away from a surface. As such, claim 19 and claims 20, 21, and 23, which depend therefrom, are patentable over Katase and Yamaguchi.

Conclusion

In light of the above remarks, claims 1-3, 8, 11, 12, 15, 16, 19-21 and 23 are patentable over the cited art. Reconsideration and allowance of the claims is respectfully requested.

The Director is authorized to charge any fee deficiency required by this paper or credit any overpayment to Deposit Account No. 23-1123.

Respectfully submitted,

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